I claim:

1. (Amended) A method of detecting fractures in a fractured zone in an Earth formation, comprising the steps of:

    a. propagating a plurality of acoustic waves through the fractured zone so that the plurality of acoustic waves reflect off a horizon in the formation;

    b. receiving and recording a plurality of seismic traces responsive to and representative of the acoustic waves propagating through the fractured zone wherein a first portion of the seismic traces corresponds to a first window located above the fractured zone in the formation, and a second portion of the seismic traces corresponds to a second window located below the fractured zone in the formation;

    c. generating a first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window;

    d. generating a second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window;

    e. superimposing the first frequency spectrum onto the second frequency spectrum thereby generating a superimposed frequency spectrum and defining from the superimposed frequency spectrum a low frequency and a high frequency;

    f. when the low frequency and the high frequency is defined, further defining from the superimposed frequency spectrum a plurality of amplitude values, the plurality of amplitude values including: an amplitude $Fa(high)$ of the first frequency spectrum at the defined high frequency, an amplitude $Fa(low)$ of the first frequency spectrum at the defined low frequency, an amplitude of the second frequency spectrum

Fb(high) at the defined high frequency, and an amplitude Fb(low) of the second frequency spectrum at the defined low frequency;

g. from the plurality of amplitude values, defining a t^* attribute by subtracting the natural log of the ratio of Fa(low) to Fb(low) from the natural log of the ratio of Fa(high) to Fb(high) to get a numerator and dividing the numerator by a denominator which comprises the defined high frequency less the defined low frequency;

h. plotting the t^* attribute on a map and assigning a unique color to the t^* attribute.

5. (Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for detecting fractures in a fractured zone in an Earth formation, the method steps comprising:

a. operating on a plurality of received and recorded seismic traces, responsive to and representative of a plurality of acoustic waves propagating through the fractured zone and reflecting off a horizon in the formation, to define a first portion of the seismic traces corresponding to a first window located above the fractured zone in the formation, and to define a second portion of the seismic traces corresponding to a second window located below the fractured zone in the formation;

b. generating a first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window;

c. generating a second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window;

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d. superimposing the first frequency spectrum onto the second frequency spectrum thereby generating a superimposed frequency spectrum and defining from the superimposed frequency spectrum a low frequency and a high frequency;

e. when the low frequency and the high frequency are defined, further defining from the superimposed frequency spectrum a plurality of amplitude values, :including an amplitude Fa(high) of the first frequency spectrum at the defined high frequency, an amplitude Fa(low)of the first frequency spectrum at the defined low frequency, an amplitude of the second frequency spectrum Fb(high) at the defined high frequency, and an amplitude Fb(low) of the second frequency spectrum at the defined low frequency;

f. from the plurality of amplitude values, defining a t* attribute by subtracting the natural log of the ratio of Fa(low) to Fb(low) from the natural log of the ratio of Fa(high) to Fb(high) to get a numerator and dividing the numerator by a denominator which comprises the defined high frequency less the defined low frequency; and

g. plotting the t* attribute on a map and assigning a unique color to the t* attribute.

9. (Amended) An apparatus adapted for detecting fractures in a fractured zone in an Earth formation, the apparatus comprising:

a. a. first means for operating on a plurality of received and recorded seismic traces, responsive to and representative of a plurality of acoustic waves propagating through the fractured zone and reflecting off a horizon in the formation, to define a first portion of the seismic traces corresponding to

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a first window located above the fractured zone in the formation, and to define a second portion of the seismic traces corresponding to a second window located below the fractured zone in the formation;

b. a second means to generate a first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window and to generate a second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window;

c. .a third means for superimposing the first frequency spectrum onto the second frequency spectrum thereby generating a superimposed frequency spectrum and defining from the superimposed frequency spectrum a low frequency and a high frequency;

d. a fourth means for further defining, from the superimposed frequency spectrum, a plurality of amplitude values when the low frequency and the high frequency is defined, the plurality of amplitude values including an amplitude $Fa(high)$ of the first frequency spectrum at the defined high frequency, an amplitude $Fa(low)$ of the first frequency spectrum at the defined low frequency, an amplitude of the second frequency spectrum $Fb(high)$ at the defined high frequency, and an amplitude $Fb(low)$ of the second frequency spectrum at the defined low frequency;

e. a fifth means for defining a t* attribute from the plurality of amplitude values by subtracting the natural log of the ratio of $Fa(low)$ to $Fb(low)$ from the natural log of the ratio of $Fa(high)$ to $Fb(high)$ to get a numerator and dividing the numerator by a denominator which is the defined high frequency less the defined low frequency; and

f. a sixth means for plotting the t* attribute on a map and assigning a unique color to the t* attribute.

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